

# **Real-Time Measurement of the Volatile Fraction of Diesel Particulate Matter Using Laser-Induced Desorption with Elastic Light Scattering (LIDELS)**

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## **ABSTRACT**

A new diagnostic technique is described that has the capability of making real-time, *in situ* measurements of the volatile fraction of diesel particulate matter (PM). LIDELS uses two laser pulses of comparable energy, separated in time by an interval sufficiently short to freeze the flow field, to measure the change in PM volume caused by laser-induced desorption of the volatile fraction. The first laser pulse produces elastic light scattering (ELS) that gives the volume of the total PM, and also deposits the energy to desorb the volatiles. ELS from the second pulse gives the volume of the remaining solid portion of the PM, and the ratio of these two measurements is the quantitative solid volume fraction. Calibration is required for the individual total PM and solid fraction to be quantitative. Applicability of the technique is demonstrated for load and EGR sweeps for a turbocharged, direct-injection diesel engine.